CLAIMS

1. A method of minimizing probability of error for decoding messages of unequal lengths and unequal *a posteriori* probability for blind transport format detection (BTFD), comprising:

receiving an incoming stream characterized by a preselected transport format;

computing a metric for each possible transport format of the incoming stream, including the preselected format; and

determining the preselected transport format based on a best one of the computed metrics.

2. The method of claim 1, wherein the metric is a function of:

$$\frac{\left(\sqrt{\alpha_s \hat{E}_s \alpha_p \hat{E}_p}\right)}{\beta(\alpha_s \hat{N}_t \alpha_p \hat{E}_p)} E_{VD}(n_c) - \frac{n_c\left(\sqrt{\alpha_s \hat{E}_s \alpha_p \hat{E}_p}\right)^2}{2\alpha_s \hat{N}_t \alpha_p \hat{E}_p} - n_m \ln(2) \quad ,$$

where

$\alpha_s \hat{E}_s$ is an estimated energy of a signal component per symbol in the incoming stream,

$\alpha_p \hat{E}_p$ is an estimated energy of a pilot component per symbol in the incoming stream,

$\alpha_s \hat{N}_t$ is an estimated noise variance per symbol in the incoming stream,

n_m is a length of a message corresponding to the transport format under consideration,

n_c is a length of a codeword corresponding to the transport format under consideration, and

$E_{VD}(n_c)$ is an energy computed by a Viterbi decoder for a hypothesized codeword of length n_c.

3. The method of claim 2, wherein the BTFD is in a CDMA system.

4. The method of claim 3, wherein the CDMA system is a W-CDMA system.

5. A method of minimizing a probability of error for decoding messages of unequal lengths and unequal *a posteriori* probability for blind rate detection, comprising:

receiving an incoming stream characterized by a pre-selected rate;

computing a metric for each possible rate of the incoming stream, including the pre-selected rate; and

determining the pre-selected rate based on a best one of the computed metrics.

6. The method of claim 5, wherein the blind rate detection is in a CDMA system.

7. The method of claim 6, wherein the CDMA system is an IS-95 CDMA system.

8. A method for decoding messages in which at least one signaling characteristic of the messages is not known *a priori*, the method comprising:

receiving a sequence for a transmitted message;

computing a metric value for each of a plurality of hypothesized messages corresponding to a plurality of hypotheses for the at least one unknown signaling characteristic of the transmitted message, wherein the metric value is computed based on a metric derived to approximately maximize a joint *a posteriori* probability between the received sequence and the hypothesized messages; and

selecting a hypothesized message having a best metric value as the transmitted message.

9. The method of claim 8, wherein the at least one unknown signaling characteristic relates to a transport format for the transmitted message.

10. The method of claim 9, wherein the transport format identifies a particular length for the transmitted message selected from among a plurality of possible message lengths.

11. The method of claim 8, wherein the at least one unknown signaling characteristic relates to a rate of the transmitted message.

12. The method of claim 11, wherein the transmitted message has a particular rate selected from among a plurality of possible rates.

13. The method of claim 12, wherein plurality of possible rates include full, half, quarter, and eight rates.

14. The method of claim 8, wherein the metric is derived based on a particular signaling scheme used to map the transmitted message to the sequence.

15. The method of claim 8, wherein the metric is expressed as:

$$\text{metric} = \left(\frac{1}{\sigma^2} \sum_{i=1}^{n_c} x_i y_i \right) - \left(\frac{n_c V^2}{2\sigma^2} \right) - n_m \ln(2) \quad ,$$

where

$\underline{m}$ is the hypothesized message being evaluated,

$\underline{y}$ is the received sequence,

n_m is a length of the hypothesized message being evaluated,

n_c is a length of a codeword corresponding to the hypothesized message being evaluated,

V is a magnitude of a transmitted sequence corresponding to the received sequence, and

σ^2 is a variance of noise in a channel via which the received sequence was transmitted.

16. The method of claim 8, wherein the metric is expressed as:

$$\text{metric} = \left(\frac{1}{\sigma^2} \sum_{i=1}^{N_C} x_i y_i \right) - \left(\frac{N_C R V^2}{2\sigma^2} \right) - n_m \ln(2) \quad ,$$

where

$\underline{m}$ is the hypothesized message being evaluated,

$\underline{y}$ is the received sequence,

n_m is a length of the hypothesized message being evaluated,

N_C is a length of a codeword corresponding to the hypothesized message being evaluated,

$\sqrt{R}V$ is a magnitude of a transmitted sequence corresponding to the received sequence, and

σ^2 is a variance of noise in a channel via which the received sequence was transmitted.

17. The method of claim 8, wherein the metric is expressed as:

$$\text{metric} = f_1(E_{VD}) - f_2(E_C) - f_3(n_m) \quad ,$$

where

E_{VD} is an energy related to a correlation between the received sequence and a sequence generated by re-encoding the hypothesized message being evaluated,

E_C is an energy related to a transmitted sequence corresponding to the received sequence,

n_m is a length of the hypothesized message being evaluated, and

$f_1()$, $f_2()$, and $f_3()$ represent functions of an argument within the parenthesis.

18. The method of claim 8, wherein the metric includes a first term indicative of an energy between the received sequence and a sequence corresponding to the hypothesized message being evaluated.

19. The method of claim 18, wherein the first term is derived by a Viterbi decoder used to decode for each hypothesized message.

20. The method of claim 18, wherein the metric includes a second term having a variable for each unknown signaling characteristic.

21. The method of claim 20, wherein the metric includes a second term having a variable for a length of a code sequence corresponding to the hypothesized message being evaluated.

22. The method of claim 20, wherein the metric includes a second term having a variable for a rate of the hypothesized message being evaluated.

23. The method of claim 20, wherein the metric includes a third term having a variable corresponding to a length of the hypothesized message being evaluated.

24. The method of claim 8, wherein the metric includes a variable for a signal amplitude of a transmitted sequence corresponding to the received sequence.

25. The method of claim 8, wherein the metric includes a variable for a variance of noise included in the received sequence.

26. A receiver unit in a wireless communication system, comprising:

a demodulator configured to receive and process input samples to derive a received sequence of symbols, and to further derive and provide a plurality of hypothesized sequences based on the received sequence and corresponding to a plurality of hypotheses for at least one unknown signaling characteristic of a transmitted message being recovered from the received sequence;

a decoder coupled to the demodulator and configured to decode each hypothesized sequence to provide a corresponding decoded message; and

a metric calculator operatively coupled to the demodulator and decoder and configured to compute a metric value for each hypothesized sequence, wherein the metric value is computed based on a metric derived to approximately maximize a joint *a posteriori* probability between the received sequence and the hypothesized sequences, and to further select a decoded message associated with a best metric value as the transmitted message.

27. The receiver unit of claim 26, wherein the decoder is a Viterbi decoder.

28. The receiver unit of claim 26, wherein the demodulator includes:

a pilot processor configured to receive and process the input samples to provide pilot symbols,

a data processor configured to receive and process the input samples to provide data symbols, and

a coherent demodulator coupled to the pilot and data processors and configured to coherently demodulate the data symbols with the pilot symbols to provide the received sequence of symbols.

29. The receiver unit of claim 26, further comprising:

a signal and noise estimator coupled to the demodulator and configured to estimate signal amplitude of symbols in a transmitted sequence corresponding to the received sequence and to further estimate noise variance in the received sequence.